Green and prosperous land

How decarbonising road transport can be a success story for UK industry

June 2023

Summary

The automotive industry - whether in the UK, EU or USA - faces the biggest challenge in its 120 year history with the switch to electric cars and the threat of increased competition from China. Public policy responses to this vary. The European Union and its member states are ramping up support for car, van and truck makers and their supply chains to meet these challenges. The USA offers massive subsidies through its Inflation Reduction Act. In the UK by contrast, even having an industrial strategy is contested and UK car makers struggle with post-Brexit realities.

A climate transition that simply results in the loss of jobs in fossil fuel linked industries without creating new ones will not be a just transition. The public want to see action to get to net zero emissions, but support will be stronger if decarbonisation works for UK jobs and industry too.

How can this be done? This briefing sets out six areas where the UK Government can act. Government policy needs to:

1. Provide policy certainty to support investment plans
2. Prioritise support for foundational sectors (including renewable energy and battery production and supply chain) on which a successful future facing economy depends
3. Have a close strategic relationship with the EU and others to support battery manufacturing and supply chains
4. Ensure skills policy and regional policy are addressed
5. Work with private finance to unlock greater levels of investment and scale up innovation
6. Ensure that the planning and permitting system and relevant agencies have the capacity and capability to deliver at pace

An industrial strategy building on the UK's strengths and working with partners is needed. The UK may not be able to compete with the level of subsidies on offer from the US or China or to develop the entire electric vehicle supply chain on its own. But integrating with the large EU market will help the country carve out its space in this changing industry.

1. Why industrial strategy matters for decarbonisation

This briefing sets out Transport and Environment UK's thinking on how the UK should approach climate and industrial policies that can together deliver strong environmental, social and economic goals.

It sets out why an industrial policy is important for the UK's climate ambitions (and why industry needs an effective climate policy); the specific circumstances in the UK for the motor industry and climate change; and recommendations on what industrial policy in the transition to net zero should look like.

1.1 Why a UK industrial policy is needed for UK climate goals - and why industry needs an effective climate policy

Industrial policy - or the lack of it - is an increasing focus in policy and political debates, as the UK attempts to kick start sluggish growth alongside delivering the economy-wide changes to achieve its net zero targets. These debates have become more high profile since the US passed its Inflation Reduction Act last summer (which commits nearly $400 billion in federal funding to clean energy) and the EU responded with its Green Deal Industrial Plan and Net Zero Industry Act.

The UK has been a world leader in decarbonisation in comparison with the USA and many other European countries. This has included major changes in electricity generation with the carbon intensity of Britain's grid falling to 177gCO2/kWh in 2022, 65% below a decade earlier.[1] On transport, the UK moved earlier than others to set phase out dates for petrol and diesel new car sales, and will introduce a zero emissions vehicle mandate from 1 January 2024 to require an increase in the supply of electric cars. The UK was the first major economy to have a net zero emissions goal set in legislation, and published its Net Zero Strategy and Transport Decarbonisation Plan in 2021. There is strong cross-party support for ambition on climate change.

However, at the same time the UK economy continues to struggle. Business investment in real terms is no higher than it was in 2016.[2] Productivity growth has fallen - between 1974 and 2008, the UK's productivity grew at an average rate of 2.3% a year compared to just 0.5% between 2008 and 2020.[3] UK productivity is about 20% lower than the USA, Germany and France.

Brexit has created trade barriers with the EU which threaten just-in-time supply chains. The Trade and Cooperation Agreement will see the UK face tightening of rules of origin from 2024, which could mean that UK car manufacturing will face tariffs if batteries are sourced outside the UK and EU.

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[1] How the UK transformed its electricity supply in just a decade, Carbon Brief
https://interactive.carbonbrief.org/how-uk-transformed-electricity-supply-decade/

[2] Business investment in the UK: January to March 2023 provisional results (June 2023)
https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/businessinvestment/januarytomarch2023provisionalresults

[3] Why is UK Productivity Low and How Can It Improve?, NIESR (September 2022)
https://www.niesr.ac.uk/blog/why-uk-productivity-low-and-how-can-it-improve

Government industrial policy has been inconsistent. UK strengths in research and innovation, often drawing on the expertise of UK universities and research centres, have not been matched by government policy or private finance to enable innovative firms and projects to scale up. Theresa May's interest in industrial policy (which saw industrial strategy added to the name of the business department and the creation of the Industrial Strategy Council) was not picked up under Boris Johnson and "industrial strategy" is now lost from the name and remit of BEIS' successor departments.

The automotive sector is a good example of wider issues for industrial policy. Car production in the UK has been under pressure since 2016, falling by half in less than a decade. Biden's Inflation Reduction Act incentives are pulling car makers and battery investment to the USA. Will they/won't they decisions on new production by global car manufacturers and the collapse of the Britishvolt gigafactory have highlighted the challenges the UK automotive industry faces, even with the expected decision by Jaguar Land Rover to build a new battery plant in the UK.

UK industry has also not necessarily been the ones to benefit from UK climate policies. While the number of green jobs has grown considerably in the UK, the development of UK offshore wind (for example) drew on knowledge and expertise that had been developed in countries such as Denmark, Norway and Germany, with companies from those countries delivering capacity increases and with maintenance and construction jobs in offshore wind often relying on non-UK labour.

Climate policy will create new jobs, but also end jobs linked to fossil fuels. Get policy right and the net zero transition will be a just transition. Get policy wrong, and the UK could see a re-run of 1980s deindustrialisation and the long-term waste in terms of lives and resources that this created.

Additionally, if climate policies are seen to benefit non-UK businesses and jobs, support for the transition to a decarbonised economy will likely be weaker, particularly in parts of the UK which will be key battlegrounds in the next election.

Weak industrial performance by key sectors will also hinder decarbonisation. The UK needs to generate new electricity generation at a rate never before seen to electrify sectors previously relying on fossil fuels.[4] That electricity needs to be affordable to ensure individuals and companies switch away from fossil fuels. Green hydrogen supply is needed within the UK to meet aviation and shipping needs - and the physics of hydrogen imply supply needs to be located relatively close to where it will be used. This needs an unprecedented level of investment, reskilling workforces and delivery of new infrastructure at a scale not seen outside of wars. The market alone will not be able to achieve this.

[4] A reliable, secure and decarbonised power system by 2035 is possible – but not at this pace of delivery, Climate Change Committee (March 2023) https://www.theccc.org.uk/2023/03/09/a-reliable-secure-and-decarbonised-power-system-by-2035-is-possible-but-not-at-this-pace-of-delivery/

Get industrial policy wrong and we will not have the industries we need to support decarbonisation, and will face more opposition to green policy. Get climate policy wrong, and industry faces higher costs and political and policy uncertainty that discourages investment. The two need to go hand in hand together.

1.2 Lonely island - how the UK is caught between the USA and the EU

Some have called for the UK to simply match the USA's approach in subsidies and tax credits. However, the US government has had to focus on protectionist subsidies/incentives rather than regulation as the only way to get climate policy through Congress. In contrast, the UK and EU have a wider range of policy tools to drive down emissions, and should be able to achieve policy goals with less cost.

The UK is also unlikely to be able to match US levels of subsidy. Both the Conservative government and Labour opposition are committed to fiscal rules that make very high levels of additional spending unlikely, with Labour's 2021 commitment to spend £28 billion of capital spending for their Green Prosperity Plan now downgraded to an aim to achieve this in the second half of the next Parliament.[5]

The UK situation flowing from Brexit is also a key factor in industrial policy and for foreign direct investment (FDI). FDI is especially important for the UK automotive sector where global companies dominate mainstream car and van manufacturing and will be deciding where to invest as they transition to EVs. These handful of international manufacturers are not based in the UK and produce cars and vans across the world. They do not owe the UK anything if they decide that locating production elsewhere makes more sense. Their decisions will decide if the UK car industry has a future. The UK's previous advantage of access to the EU single market with added labour market flexibility and political stability has been changed by Brexit.

The UK automotive industry itself has some particular features. It is overwhelmingly export-led with 80% of production exported.[6] Production has been in decline since the mid-2010s but it is still a major employer with more than 182,000 employed in vehicle manufacturing and some 780,000 in total across the wider automotive industry. Automotive makes up 10% of total UK exports.[7] The full supply chain for EVs could come from UK suppliers, according to the SMMT, but the UK currently

[5] I won't abandon Labour's ambitions for industry – nor fiscal responsibility, Rachel Reeves, The Times (June 2023)
https://www.thetimes.co.uk/article/rachel-reeves-i-wont-abandon-labours-ambitions-for-industry-nor-fiscal-responsibility-v02sjx8vv
[6] Why an ambitious ZEV mandate will not affect UK jobs, Transport & Environment UK (November 2022)
https://www.transportenvironment.org/discover/why-an-ambitious-zev-mandate-will-not-affect-uk-jobs
[7] SMMT Motor Industry Facts 2023, SMMT (April 2023)
https://www.smmt.co.uk/reports/smmt-motor-industry-facts/

lacks investment to meet the ten gigafactories that the Faraday Institution says are needed.[8] Imports of cars to the UK are worth £35.6 billion compared to £26.5 billion value of car exports.[9]

2. What should a "climate-win, industry-win" strategy look like

It should be possible to have an ambitious, effective and affordable industrial strategy to help ensure the UK achieves its climate ambitions on time or early; to support a just transition rather than 1980s style deindustrialisation; and to develop green industries to support the economy.

Key elements of a strategy are set out below. The UK lacks large natural resources, and its economy has always been based to a significant extent on trade rather than domestic consumption. It is a significant economy but its markets are dwarfed by that of the USA and EU. It will struggle to compete on costs in comparison to China. It must make the most of any advantages it has.

2.1. Policy certainty - the future is electric

First, the UK should be able to offer policy certainty. All parties agree on the country's net zero goals. Now we need to see certainty about the means to get there.

The zero emission vehicle (ZEV) mandate provides this for cars and vans and will come into operation in January 2024. The final regulations need to ensure that any flexibilities in the early years (eg for manufacturers to "borrow" credits if they underperform on the promise of paying back with over-delivery later) does not undermine its effectiveness.[10]

The ZEV mandate for cars and vans now needs to be followed by a mandate for zero emission trucks to provide additional certainty in the run-up to the 2035 phase-out date for sales of new diesel trucks up to 26 tonnes and the 2040 phase out for sales of diesel trucks above 26t. The government also needs to move beyond its "technology neutral" stance on HGVs.[11] Research commissioned by T&E UK shows that battery electric trucks will be capable of meeting the vast bulk of HGV needs in the coming years - the debate is just on how small a number the remaining cases which might, for instance, require hydrogen fuel cells or another technology will be. Given this, action can be taken now to support decarbonising the bulk of HGV uses, providing enough policy certainty for companies to invest based on that direction of travel.

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[8] UK Electric Vehicle and Battery Production Potential to 2040 – update, Faraday Institution (June 2022) https://www.faraday.ac.uk/ev-economics-study-2022/

[9] UK Trade in Numbers, Department for Business and Trade (May 2023) https://www.gov.uk/government/statistics/uk-trade-in-numbers/uk-trade-in-numbers-web-version

[10] UK ZEV mandate and CO2 emissions regulation, Transport & Environment (May 2023) https://www.transportenvironment.org/discover/consultation-response-uk-zev-mandate-and-co2-emissions-regulation/

[11] E-trucks: It's time for the UK to make the switch, Transport & Environment UK (May 2023) https://www.transportenvironment.org/discover/e-trucks-its-time-for-the-uk-to-make-the-switch/

The UK's Climate Change Act provides a robust framework for action to reduce emissions. The UK also has a good record on energy decarbonisation, with strong growth in domestic renewable energy. This should enhance its energy security as well as reducing carbon emissions and the price of electricity in the long-term. Protecting the UK from swings in international energy prices and reliance on regions with geopolitical tensions will be a key part of the UK's industrial offer. This also requires that the UK should decouple the price of electricity and renewables from gas.

Many other manufacturing countries have far more carbon-intense electricity generation – Germany's emissions are 31% higher than the UK's, the USA is 41% higher, South Korea 70% higher and China 102% higher.[12] The UK can be positioned to attract business investment on the basis of an already demonstrated ability to reduce emissions, and for goods manufactured in the UK to be much lower carbon with lower energy costs than competitors. Investors should be able to trust the UK record and know that its carbon reduction plans are deliverable compared to other countries with less of a track record. The UK and other countries are also developing policies to address any carbon leakage where production and associated emissions move from one country to another due a short-term race to the bottom to regions without carbon pricing and less developed climate regulation.

2.2 Prioritisation - support for foundational sectors

Second, there is a need for a debate to identify which industrial sectors the UK should focus on. Some sectors will be absolutely necessary for the UK's decarbonisation, including electricity generation and supply and hydrogen (primarily for marine and aviation fuel). Public policy should be looking at these sectors as employment opportunities to offset job losses in fossil fuel related industries. These foundational sectors will play a vital role across industries in future.

Other sectors to focus on should look at where the UK has or could have competitive advantage. Beyond road transport, this could include zero emission aircraft and ships. The Grantham Institute has also suggested that the UK could have an advantage in connected and autonomous vehicles, but their feasibility remains very uncertain.[13]

Whether the UK automotive sector as a whole has a competitive advantage remains a matter of debate. A Resolution Foundation paper for the Economy 2030 programme suggested that "the UK does not have comparative strengths in goods or technologies relating to ZEVs".[14] The economies of scale for an industry that has halved production since 2016 and which face barriers to trade with the major EU market are challenging.

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[12] Race To Zero: Powering Up Britain's EV Supply Chain, SMMT (March 2023) https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Race-to-Zero-report.pdf

[13] Seizing sustainable growth opportunities from zero emission passenger vehicles in the UK, LSE Growth Commission (February 2020) https://www.lse.ac.uk/granthaminstitute/publication/seizing-sustainable-growth-opportunities-from-zero-emission-passenger-vehicles-in-the-uk/

[14] Growing clean, Resolution Foundation (May 2022) https://economy2030.resolutionfoundation.org/wp-content/uploads/2022/05/Growing_clean_report.pdf

However, the UK automotive sector remains a major employer and is a source of innovation. Around 11% of UK business research and development is made by the automotive sector, which has 22 dedicated R&D centres across the country, drawing on the UK's strengths around university-industry collaboration.[15] The spill-over benefits of the industry in key regions should also justify continued focus from policy makers.

80% of cars built in the UK are exported. Two out of three cars that are exported go to the EU, China and the USA where there are targets that will heavily restrict the sale of petrol and diesel vehicles in future. Analysis by ECIU suggests that if the UK fails to respond and develop its ability to manufacture EVs, it risks £13bn of exports by 2030.[16] Despite decline, the UK automotive sector should not be written off.

As such, there is a strong case for batteries as a foundational sector, including beyond road transport for shipping and aviation decarbonisation. Section 2.3 sets out more what is needed to support the battery supply chain in the UK.

It is also worth noting that the UK already funds the automotive sector through a mix of research and demonstration project funding (see box below) but a particular challenge is for funding and finance to help bridge the gap between pilots and scalable delivery at a commercial scale. This is covered later in the section on private finance.

Current UK funding to support automotive decarbonisation

The UK Government announced £1 billion to support the electrification of UK vehicles and their supply chains in October 2019. More recently, the Government pledged to spend £850 million of this £1 billion by 2025 through the Automotive Transformation Fund. This included pledged funding for the Britishvolt gigafactory in Northumberland (which was not released before Britishvolt went into administration) and lithium mining trials in Cornwall.

In addition, the Government has also committed funding for the Faraday Battery Challenge which aims to put the UK at the global forefront of design, development, manufacturing, and recycling of electric batteries. This has included support for the UK Battery Industrialisation Centre. Government funding for this has been £541 million since 2017 with £211 million in new government funding from 2022 to 2025.

There are also other programmes to support the transition of the automotive sector. This includes the work of the Office for Zero Emission Vehicles, assistance for R&D through the Advanced Propulsion Centre, and work to support the growth of the UK's power electronics, machines and EV

[15] Race To Zero, SMMT (March 2023)
https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Race-to-Zero-report.pdf
[16] UK car exports on a cliff edge, ECIU, June 2023,
https://eciu.net/analysis/reports/2023/uk-car-exports-on-a-cliff-edge

supply chain through Driving the Electric Revolution (with £80 million funding for electrification technologies including power electronics, electric machines and drives).

2.3 Brexit means having a close relationship with the EU and others to support battery manufacturing and supply chains

Above all, the industry needs to have a secure battery supply chain in the UK, including the recycling of battery components. The battery supply chain is also likely to support other sectors too, including the wider energy system as well as other transport modes. Developing this should be the priority for any financial support and, in addition to gigafactories, could include minerals processing, cell manufacturing, battery reuse and remanufacturing, materials recovery and recycling.

The UK may not be able to compete with the level of subsidies on offer from the US or China to develop the entire EV supply chain on its own. But integrating with the large EU market will help the country carve out its space in the EV industry.

Take lithium, for example. Over a third of all projects to refine lithium in Europe are planned in the UK. But these plans are not viable without a strong offtake from battery gigafactories. Across the channel, at least four battery factories are planned less than 30 miles away by companies ACC, Envision, ProLogium and Verkor in Northern France.

The UK and countries in the EU could form a sort of Europe-wide vertical value chain. For instance, the UK has a potential lead in lithium processing which could be sent to EU countries for battery cell manufacturing. Those batteries could then be put into electric cars produced on both sides of the channel and traded without tariffs. At the end of their lives, batteries could be shipped to the UK for recycling.

Faced with competition from China and others, a pan-European battery supply chain is stronger than the EU and the UK working on their own. In the short term, a targeted green battery alliance could be launched, similar to the one Norway has with the EU. This should update the Brexit Trade and Cooperation Agreement to support a joined up EV supply chain.

The UK Government's diplomatic role is also important. The UK needs to grow and develop strategic relationships with a range of countries to secure critical raw materials for a green energy independent future. For example, lithium can be secured from Australia and South America, while nickel can be secured from countries like Indonesia and Canada. Working with global mining companies will also be important to ensure the maximum volumes are freely available on the global markets.[17]

[17] The supply of battery electric cars is influenced more by global regulations rather than the supply of raw materials. A Transport & Environment briefing from May 2022 showed that 14 million battery electric vehicles can be produced globally in 2023 when taking the maximum supply of lithium batteries, nickel and battery factories to produce NMC and LFP chemistries. This is 55% more than the expected market for battery electric

It is crucial that the UK strengthens its environmental safeguards around mining, as well as demanding high standards for social and community engagement. The EU has adopted robust due diligence standards as part of its recently updated regulation concerning batteries and waste batteries. The UK should not fall behind other markets, particularly the EU, when it comes to enforcing strong standards and as such should seek to adopt the same, if not more stringent, standards.

The EU's new battery law will ensure that companies selling batteries in the EU comply with rules designed to prevent environmental, human rights and labour abuses in supply chains. Battery makers will be required to identify, prevent and address a wide range of issues including pollution and community engagement and rights. The UK should again apply similar ESG rules and apply it to all raw materials including fossil fuels, rather than just critical minerals such as lithium, nickel, cobalt and graphite. It could also encourage British investors to develop new mines using sustainable practices and provide technical expertise in partner countries.

Finally, improving recycling can help reduce the need for imported raw materials. The materials available for recycling from end-of-life batteries or scrap from European battery factories could meet 8-12% of the materials needs in 2030, rising to 12-14% in 2035. By 2030, a tenth of all cobalt, 7% of nickel and 6% of lithium needed for batteries can come from recycling. This increases considerably in the 2030s.[18] Recycling of battery and vehicle components should be supported as part of industrial policy.

2.4 Skills and regional policy

With the switch to EVs, the automotive industry is changing in fundamental ways. The UK automotive supply chain has been geared up for petrol and diesel vehicles for decades. An assessment for the government in 2019 suggested that electric vehicle production and supply chain could support 95,000 jobs.[19] However, these will be different jobs from now with both different components needed for electric vehicles and, with simpler engineering, less employees needed in manufacturing. A pan-European study estimated that this would mean a 20% reduction in employees in OEMs and a 42% reduction in employees in internal combustion engine (ICE) focused suppliers. This would be compensated by growth in non-ICE suppliers, maintenance and repair, equipment and services, energy production, energy infrastructure and recycling leaving overall employment numbers similar.[20]

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vehicles following regulatory requirements. In 2025, 21 million battery electric vehicles can be produced globally, which is almost a half more than global market expectations.

[18] A European Response to US IRA, Transport & Environment (January 2023) https://www.transportenvironment.org/wp-content/uploads/2023/01/2023_01_TE_Raw_materials_IRA_report-1.pdf

[19] Energy Innovation Needs Assessment, Vivid Economics (October 2019) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/846701/energy-innovation-needs-assessment-road-transport.pdf The figure is not comparable with estimates of current workforce as it is based on a different methodology.

[20] Is E-mobility a Green Boost for European Automotive Jobs?, Boston Consulting Group (July 2021) https://web-assets.bcg.com/82/0a/17e745504e46b5981b74fadba825/is-e-mobility-a-green-boost.pdf

These new jobs will need different skills and could often be in different locations to current employment. Government will need to play a role in helping reskill people and levelling up/regional policy needs to seize the opportunity of the full range of green industries to create employment opportunities close to where those affected by this transition live.

Budget 2023 announced details of new investment zones in the UK.[21] Green industries and advanced manufacturing are two of the priority sectors for these zones. Industries in investment zones will benefit from government grants and loans, exemption from various local and national taxes and planning flexibilities. If investment zones are the main spatial element to the UK government's industrial policy, then the approach taken needs to be explicitly in the context of the decarbonisation transition. Investment zones could be used to assist areas with fossil fuel based industries to switch to new green industrial opportunities.

2.5 Private finance and scaling up innovation

The UK's finance sector is another strength, and industrial policy should look at the potential for blending public sector funding and private finance to support innovation in green technology and scale up that innovation. The SMMT proposes a special purpose vehicle (SPV) to enable Government to co-invest in green technologies in the medium-to-long term. Similar to the European Sovereignty Fund, the SPV would take a minority stake in ventures that will allow high-potential businesses with proven technologies to rapidly scale. Once they become more attractive to private investors, Government can exit for a profit that is then reinvested, creating a virtuous circle of growth.[22]

The Green Finance Institute has proposed a battery investment facility (BIF) as a proposed demonstrator solution to help organisations access capital at a critical point in their growth when scaling operations. The BIF aims to bring together public and private capital to unlock investment in companies who can contribute to a successful battery supply chain. Public finance would be used to de-risk specific investments in key businesses in the supply chain for private sector financiers, which would otherwise sit outside of traditional risk appetite. This would help unlock funding for business to cross the "valley of death" and bridge the gap to mainstream funding.[23]

2.6 Planning and permitting at pace

The planning and permitting system is often cited as a barrier to growing green industries across Europe. The UK's system is established and has been the subject of continued reforms for over a decade with current changes in motion for both the nationally significant infrastructure planning process and the

[21] Investment Zones: Policy Offer, HM Treasury/DLUHC (March 2023)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1142995/Investment_Zone_Policy_Prospectus.pdf
[22] Race To Zero, SMMT (March 2023)
https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Race-to-Zero-report.pdf
[23] Green Finance Institute
https://www.greenfinanceinstitute.co.uk/programmes/cdrt/battery-investment-facility/

town and country planning process. The changes aim to speed up development. The UK is a crowded island with often intense competing demands on scarce land, from housing to business to flood and water management, food production, leisure uses, heritage and biodiversity. The system has to manage these demands in the added context of rising pressure from the need to adapt to climate change. What matters most to many developers is the capacity of the system to manage these competing demands, with capacity cut due to funding cuts to local authorities and to regulators like Natural England. Funding, whether from developers themselves or from public funding, is needed to support the capacity and capability of the planning system to manage development in a timely way.

3. Conclusion

The UK is now gearing up for a likely general election in 2024. As ever, the state of the economy will be centre stage. The UK economy has struggled over the last 15 years. UK decarbonisation is in many ways a success story but it has yet to fulfil its potential to give UK industry a head start in selling new green technology and services to the world. There is a short window of opportunity for the UK to develop its offer to support domestic companies to make the leap from innovative start-up to mainstream business and to attract foreign direct investment for a decarbonised future.

Further information

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